

30
CLAIMS

1. A process for treating wastewater containing suspended solids comprising adding to the wastewater a treating substance in an amount sufficient to enhance at least one of (a) the settling rate of the solids, (b) the bulk density of the solids and (c) the filterability of the solids, said treating substance being selected from the group consisting of (i) bauxite refinery residue known as red mud, and (ii) red mud that has been at least partially reacted with calcium and/or magnesium ions so as to have a reaction pH, when mixed with five times its weight of water, of less than 10.5.
2. A process for reducing the concentration of dissolved phosphorus-containing species in water containing dissolved phosphorus-containing species, the process comprising the steps of
 - (a) dispersing in said water an amount of a treating substance,
 - (b) adding to said water an amount of at least one metal ion sufficient to at least partially precipitate a phosphorus-containing compound of said at least one metal, and
 - (c) removing solids present in said water therefrom to produce a treated water;wherein said treating substance is selected from the group consisting of (i) bauxite refinery residue known as red mud, and (ii) red mud that has been at least partially reacted with calcium and/or magnesium ions so as to have a reaction pH, when mixed with 5 times its weight of water, of less than 10.5.
- 3 The process of claim 2, wherein in step (b) the metal ion is selected from the group consisting of iron, aluminium and calcium, or a mixture thereof.
4. The process of claim 2, wherein in step (b) the metal ion is iron.
5. The process of claim 3 wherein in said iron metal ion is ferric or ferrous iron or a mixture of the two.
6. The process of claim 2, wherein the removal step (c) is preceded by settlement of the precipitated phosphorus-containing compound(s) and any other solids present, suitably until the supernatant water is clear.
7. The process of claim 6, wherein one or more flocculating agents is added.
8. The process of any one of claim 2 to 7, wherein said process includes the additional step of adjusting the pH of the water before step (b).
9. The process of claim 8, wherein the adjusted pH is in the range of about 6.5 to 7.5

10. The process of any one of claim 2 to 9, wherein said process is applied to any soluble phosphorous-containing water.
11. The process of any one of claims 1 to 10, wherein said water is discharged to a freshwater receiving body.
- 5 12. The process of any one of claims 1 to 11, wherein said process further comprises the addition of a polyelectrolyte to the wastewater.
13. The process of claim 12, wherein said polyelectrolyte is selected from the group consisting of: polyacrylamides, hydrolysed polyacrylamides, polyacrylic acids, polymethacrylic acids and polyacrylic acid copolymers.
- 10 14. The process of claim 12, wherein said polyelectrolyte is a polyamine.
15. The process of claim 14, wherein said polyamine is selected from the group consisting of: polyvinylamine, polyethylene amine, polyvinylpyridine, polyvinylpiperidine, polyvinylpyrrolidine and quaternized derivatives thereof.
- 15 16. The process of any one of claims 1 to 15, wherein said process further comprises the use of a filter aid.
17. The process of claim 16, wherein said filter aid is diatomaceous earth.
18. A process for decreasing the odour of a material having an odour due to the presence of one or more sulphur-containing substances, comprising adding to said material a treating substance in an amount effective to decrease the odour of the material, 20 wherein the treating substance is selected from the group consisting of (i) bauxite refinery residue known as red mud, and (ii) red mud that has been at least partially reacted with calcium and/or magnesium ions so as to have a reaction pH, when mixed with five times its weight of water, of less than 10.5.
19. A process for decreasing the propensity of a material to develop an odour due to 25 one or more sulphur-containing substances, comprising adding to said material a treating substance in an amount effective to inhibit the development of odour in the material, wherein the treating substance is selected from the group consisting of (i) bauxite refinery residue known as red mud, and (ii) red mud that has been at least partially reacted with calcium and/or magnesium ions so as to have a reaction pH, when mixed with five times 30 its weight of water, of less than 10.5.

20. The process of claim 18 or 19, wherein said material is selected from the group consisting of sewage, sludge or compost.
21. The process of claim 19, wherein said odour is produced by microorganisms.
22. The process of any one of claims 18 to 21, wherein the amount of said treating substance is at least 5% by weight of material.
23. The process of claim 22, wherein the amount of said treating substance is between 10 to 50% by weight of material.
24. The process of claim 22, wherein the amount of said treating substance is about 25% by weight of material.
25. A composting process in which a compostable material is mixed with an amount of a material containing microorganisms and the microorganisms convert the compostable material to compost, wherein the mixture of compostable material and the material containing microorganisms further contains a treating substance selected from the group consisting of (i) bauxite refinery residue known as red mud, and (ii) red mud that has been at least partially reacted with calcium and/or magnesium ions so as to have a reaction pH, when mixed with five times its weight of water, of less than 10.5.
26. The process of claim 25, wherein the amount of said treating substance is between 2 and 20% by weight of said compostable material.
27. The process of claim 25, wherein the amount of said treating substance is about 7% by weight of said compostable material.
28. The process of claim 25, wherein said material containing microorganisms and the treating substance are added together.
29. The process of claim 25, wherein said material containing microorganisms and the treating substance are added together in the form of sludge separated from sewage by the process of any one of claims 1 to 17.
30. The process of claim 25, wherein said material containing microorganisms and the treating substance are added together in the form of material treated by the process of any one of claims 18 to 24.
31. The process of claim 29 or 30, wherein the amount of said treating substance is about 25% by weight of total solids.

32. The process of claim 25, wherein said material containing microorganisms is selected from the group consisting of: manure, dredge spoil, rotting garbage, worm casts, leaf mould, humus and active loam.

33. The process of any one of claims 1 to 32, wherein the red mud that has been at least partially reacted with calcium and/or magnesium ions has a reaction pH, when mixed
5 with five times its weight of water, of between 8.0 and 10.5.

34. The process of claim 2, wherein the red mud that has been at least partially reacted with calcium and/or magnesium ions has a reaction pH, when mixed with five times its weight of water, of between 8.0 and 10.5.

10 35. The process of any one of claims 1 to 34, wherein said treating substance is Bauxsol™.